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1: Appl Biochem Biotechnol. 1998 Spring;70-72:341-52. Related Articles, Links

Cloning and sequence analysis of the poly (3-hydroxyalkanoic acid)-synthesis genes of Pseudomonas acidophila.

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Pseudomonas acidophila can grow with CO2 as a sole carbon source by the possession of a recombinant plasmid that clones genes that confer chemolithoautotrophic growth ability derived from the H2-oxidizing bacterium Alcaligenes hydrogenophilus. H2-oxidizing bacteria produce poly(3-hydroxybutyric acid) (PHB) from CO2, but recombinant P. acidophila can produce the more useful biopolymer poly(3-hydroxyalkanoic acid) (PHA). In this study, the pha genes of P. acidophila were cloned and a sequence analysis was carried out. A gene library was constructed using the cosmid vector pVK102. A recombinant cosmid carrying the pha genes was selected by the complementation of a PHB-negative mutant of Alcaligenes eutrophus H16. The resulting recombinant cosmid pIK7 contained a 14.8-kb DNA insert. Subcloning was done. and the recombinant plasmid pEH74 was selected by hybridization with the A. eutrophus H16 pha genes. Escherichia coli possessing pEH74 produced PHB, indicating that pEH74 contained the pha genes of P. acidophila. The nucleotide sequences of the PHA-synthesis genes phaA (beta-ketothiolase), phaB (acetoacetyl-CoA reductase), and phaC (PHA synthase) in pEH74 were determined. The homologies of phaA, phaB, and phaC between P. acidophila and A. eutrophus H16 were 64.7, 76.1 and 56.6%, respectively.

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